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GENERAL CONCLUSIONS  
ON THE  
NATURE AND CURE  
OF  
HYDROPHOBIA,  
INTENDED FOR POPULAR READING.

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BY  
JAMES WOOD, M. D.  
*&c. &c.*

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SOME years ago, with the view to make up my mind on the nature and cure of Hydrophobia, in the event of my meeting with such a case, I consulted almost every author on the subject, and collected all the information in my power; and gave the result in the following paper to the Medical Society of this town. As the subject appears at present to be interesting, I have therefore determined now to circulate this paper, and I will be glad if it should in any way be productive of public benefit.

To endeavour to attain the end which first induced my attention to this disease, I have attempted to comprize all the information I have obtained, in the form of general inferences and conclusions, which can be supported by the rules of just induction, from experiments, from well-authenticated phenomena, and from analogy; and where such are wanting, I have adopted conclusions supported by the opi-

nion of the majority in any question of doubt or point of dispute. The motives I had in attempting this, were that truth may be separated from fable and superstition, and that we may be enabled to form a *quick decision*, and be impressed with a conviction of the importance of adopting, and firmly persevering in, the most approved plan of prevention and cure; the unsteady medley practice hitherto generally pursued, appearing to me not likely to lead to a successful mode of cure.

1. The disease known by the name of Hydrophobia, and occasioned by the poison of a rabid animal, appears to have existed in the most ancient times; it seems to be coeval with the dog itself, which animal has existed in all ages. The rage of the mad dog is alluded to metaphorically by Homer. It is not mentioned by Hippocrates; it therefore appears probable that it did not exist in his time near the country in which he lived. It was certainly known in the time of Asclepiades, and is mentioned by almost every writer since his time. Some countries have continued almost entirely exempt from the disease. In South America, for instance, it was never known; nor was it known in Jamaica for fifty years before 1783.

2. The saliva of any rabid animal will communicate this disease; but there is reason to believe that there is no instance of its being returned from the human species to the quadruped, the attempt having been made by inoculation. We may also venture to conclude that the disease has never been communicated by the saliva of a human person. The saliva of quadrupeds only seems capable of assimilating with the poison; and of these, the dog and the cat and their genera are the most remarkable, though horses, mules, oxen, deer, sheep, and swine, may be included in the number. How far domestic poultry and other fowls may be included, appears uncertain.



3. There are strong presumptive proofs that rabies originates spontaneously in many quadrupeds ; and the proofs are nearly positive that it arises spontaneously in the dog. *Carnivorous* animals seem most, if not only, liable to it as a spontaneous disease.

4. There seems sufficient reason to believe, that a train of symptoms, resembling those occasioned by specific contagion of rabies, have taken place in the human body as the effect of causes, producing a similar diseased action, but independent of any specific contagion being applied, or by that action generated in the body ; and that such symptoms vary only in degree from those produced by the canine poison.\*

5. The poison of a rabid animal may produce the disease through different mediums, but contact seems always necessary ; there is reason to fear that contact alone, without any wound, has occasioned the disease, when the poison has been applied to those parts where the cuticle is thin, such as the lips ; it has been communicated by clothes torn by rabid animals and applied to the lips ; it has also been conveyed by a weapon used in killing a rabid animal. There are no proofs that any of the secretions of a rabid animal but the saliva can excite the disease ; any infection having been conveyed through the medium of the breath seems also groundless.

6. A large proportion of such persons as have been

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\* Indeed, we may almost venture to conclude, that even when the disease is excited by the poison of a rabid animal, that there is no such diseased action takes place in the salivary glands in the human species as certainly does in the canine race, and other animals, assimilating that secretion in such a manner as to make it capable of exciting the disease in any other animal.

really wounded by the bite of a rabid animal are never affected with the disease. Mr Hunter mentions an instance of twenty persons being bitten by the same dog, and only one had any disease in consequence ; there are several instances of only one of twelve or fifteen persons bitten being seized with the disease.

7. Here may be noticed the general established fact, that different persons are not alike predisposed to be acted on by the same contagion, as well as that the predisposition to receive contagion varies in the same person at different periods. Dr James says, that some persons are positively exempt from any danger from the canine virus, however applied. We know some persons never take the small-pox ; some seem insensible to another particular virus, and to the infection of the plague ; the dog and the ass, by the experiments of Mr Hunter, cannot be acted upon by one particular virus.

8. The disease that takes place in consequence of the canine poison having been applied by inoculation or otherwise, has appeared at very different periods after the application of it to the body. The age and state of the body ; the season of the year ; the climate ; the degree of virulence of the poison, may be so many causes of this variation, and some of these circumstances may serve also to explain the nature of the predisposing causes. Women and children are observed to be not only most susceptible of the infection, but also in them the disease appears always at an early period after the application of the poison. The depressing passions have a considerable influence in occasioning the predisposition to this disease, which has in many instances soon appeared after their debilitating effects ; there are other instances too, where other causes producing *debility* have predisposed the system to the action of the virus, which, in many, seemed to have remained passive, until *that state* took place in a remarkable



degree. There are no well authenticated cases of its lying dormant longer than eleven or twelve months, excepting one case, in which there is good reason to suppose it did not appear for twenty months after the accident. Very few have exceeded five or six months; and the common time of its appearance is from twenty to forty days after the bite; we may therefore consider any person safe when twelve months have elapsed without any symptom appearing.

9. It seems doubtful whether the poison enters the system by the absorbents, or acts immediately on the nerves; this is a much disputed question, and there are even grounds of analogy for argument in support of both opinions; the question, however important, as leading to a just theory, it does not seem requisite at present to decide, as the supporters of both opinions *do* not differ in the smallest degree in the means to be used for the prevention or cure.

10. In most instances the wound from the bite of a rabid animal heals the same as any other wound made in the same way, by the same animal, in health. Dr James says, that he considers it as a *certain symptom of the presence of the poison*, if the wound remains any time covered with a scab.

11. The part that had been injured generally becomes painful, sometimes inflames, and swells prior to the appearance of the dreadful symptoms of the disease, which soon follow; the pain is commonly described as shooting from the part that had been wounded, in the course of the lymphatics towards the heart, or where they unite with the sanguiferous system; sometimes it shoots with great agony from the part, and fixes in the throat; there are, however, two or three well authenticated cases of the other symptoms taking place, without any complaint of pain from the part that received the poison, or any reference having been made to it by the patient; with, however, the prelude of pain in

several, the more constant symptoms of the disease begin in the following order: they have been divided into three stages.

12. First stage. Lassitude, inactivity, sensation of weight, particularly about the breast; sighing, great dejectedness, with a desire of solitude; restlessness with timidity, often prevails; the sleep (if any, for there is often no sleep) very disturbed, with terrifying dreams; external senses very acute; the common air intolerable; the least noise disturbs; the light, as well as strong colours, water, or any transparent body, very offensive; tongue dry; great thirst; eyes quick and penetrating, with something not easily expressed, in the countenance; the recumbent posture disagreeable; the pulse unsteady, changing frequently, often intermitting; starting of the muscles; sickness; vomiting.

Second stage. Pain (if there has been any) in the bitten part now vanishes; the muscles of the gula, as soon as water or other liquids touch them, become convulsed, with the utmost uneasiness in swallowing, and a sense of suffocation; solids often swallowed with less pain; pain about the upper part of the stomach; sense of heat in the stomach; palpitations of the heart; copious flow of viscid saliva, which is productive of great distress; swallowing it producing convulsions, and the act of spitting it out difficult, on account of its viscosity, which sometimes produces a hollow sound.

Third stage. Pain in swallowing, with every other symptom, increased; solids often still swallowed without much pain; pupil often much dilated, with loss of sight; hands and feet cold; pulse intermitting, weak, and irregular; spasms more frequent and violent; frequent delirium, but commonly attendant on the spasm; in the interval of the paroxysms the mind is commonly collected, and all the mental powers unusually acute and perfect; sometimes in the fits a desire to bite; the strength fails rapidly, and death quickly



closes the scene. This event sometimes takes place as if the effect of strangulation ; sometimes in the midst of a convulsive fit ; very often in a placid manner, without any struggle, and not unfrequently with a smile on the countenance.

13. Death commonly takes place about the third day from the first appearance of the symptoms.

14. Dissections, though exhibiting appearances very much alike, do not lead to much explanation of the symptoms ; the membrane lining the wind-pipe and throat, is sometimes found slightly inflamed, and sometimes the stomach exhibits the same appearance, and the intestines in different parts ; the brain, spinal marrow, and all the viscera are found much drier than usual ; the lungs stuffed with blood ; the heart and arteries very full of blood, and the veins almost empty.

15. There are well authenticated cases of convulsions and death following the bite of a rabid animal, in which no difficulty of swallowing or aversion to liquids took place.

16. The aversion to liquids, with convulsions on swallowing them, has appeared a symptom in other diseases, viz. in inflammation of the stomach, in hysteria, in epilepsy, in locked jaw, in some fevers, and in different species of sore throat.

17. It is very remarkable that the dog, whether the disease is spontaneous or acquired, never experiences that dreadful symptom which so commonly follows as an effect of his poison in the human body, the hydrophobia\* ; this is contrary to the vulgar opinion. Neither does any other animal experience this symptom.

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\* The general appearance and progress of the symptoms of rabies in the dog, are as follow :—It becomes heavy, lays down in a corner, and

18. The principal symptoms of the disease produced by the poison of a rabid animal, are explicable on the theory of convulsion, delivered by every pathological writer ; the proximate cause of such an affection is generally allowed to be mobility, which seems to consist in increased irritability\* : when it shall be discovered what the source of irritability is, we may form more accurate ideas of convulsion ; at present, no hypothesis is attempted ; facts only are searched for ; and all that can be done, is to form conclusions from the nature of the remote causes ; all the known predisponent causes of locked jaw, epilepsy, hysteria, and simple convulsion, are also predisponent causes of this disease. The canine poison is often insufficient to produce the disease without the co-operation of these causes.

19. The *dread of water* which has gained this disease a name†, and a separate discussion from any other convulsive affection, is now generally allowed to be satisfactorily explained on the association of ideas, after the swallowing of water has been once attempted ; the sight of water, or sound produced by any fluid, is explicable in the same manner : why all the

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does not readily rise ; or it shews some other change in its accustomed habits : its eyes become dull, and it does not eat as usual, (it should now be tied up) its temper soon changes, and it is then apt to bite ; after this, if at liberty, it quits the house, runs about in no particular direction, and snaps at any animal that comes in its way : in a day or two more it dies convulsive. The disease in the dog is a fever, and the animal becomes delirious, and is often desirous of water ; but in the human species the disease is not fever, it is of the nature of spasm, which water in swallowing brings on, or makes worse. Worming dogs does not prevent the bite nor its effects.

\* Convulsion and spasm sometimes take place from an opposite state of the muscular fibre, such as is produced by lead ; calomel is useful in the latter, not in the former.

† Hydrophobia, from the Greek, *Hudor*, water, and *phobeo*, to fear.



external senses are so easily affected in this disease, is readily explained from the increased irritability of the whole body producing morbid action, and sensation. Solids are generally swallowed with more ease than fluids, during the presence of the symptom of hydrophobia, because an affection of the muscles of deglutition proceeding from the disease under consideration, differs most evidently from an affection of the same muscles proceeding from a state of inflammation, and consequently distension. In the latter, liquids are swallowed with greater ease, because they require less exertion of the muscles affected than solids, the swallowing of which gives great pain, by increasing the preternatural distension already existing ; in the former, liquids are swallowed with greater difficulty than solids, because they require a greater exertion of the muscles, over which the patient has entirely lost the power of command ; but solids are enabled to descend by their own bulk, proving a resistance to the spasms from the power of distension, which liquids do not possess in the same degree.

20. The disease produced by the poison of a rabid animal seems very properly placed by nosological writers as a genus in the order of Spasm, and class of Neuroses ; but on account of the *dread of water* being a symptom of other diseases, and the disease under consideration having existed without that symptom, and from the wish, which all should feel, of not multiplying diseases, by exhibiting more genera than requisite, we may venture no longer to distinguish this disease by the name of a symptom, but placing it under the genus Convulsion, as a species, give the following definition of it. *Convulsion, from the poison of a rabid animal, almost always accompanied with a dread of liquids.* All those names by which this disease has been distinguished, that give any idea of the presence of madness, in any sense of the word, are founded in error. We may with equal propriety apply



the term rabies to the delirium in typhus, and many other diseases. It appears to be placed with more propriety as a species of convulsion, than as a species of the genus *Tenatus*, because spasmodic diseases have been always divided into two kinds; the one, as in locked jaw, where the morbid contraction is not followed by relaxation; the other, as in convulsion, where the morbid contraction is followed by spontaneous relaxation.

*Cure of Convulsion from the Poison of Rabid Animals.*

When superstition, fable, prejudice, and unusual dread at the appearance of this disease are banished from the minds of medical men, and a just theory shall lead the way to a steady practice, and when we consider that the various and other contagions, which threatened to destroy half the human race, have by means of the cow-pox\* and *dilution*, by mercury and the nitric acid, been rendered by degrees less and less formidable, we may hope also to see the effects of the canine poison gradually counteracted or removed; and the medical world receive this disease amongst the number that can be combated by the powers of art and medicine. Perhaps this view of the disease, however simplified by considering it as a convulsive affection, will be thought by some, not to give much more hope from such powers, since locked jaw, epilepsy, and other convulsive affections, but locked jaw in particular, to which this disease has the nearest resemblance, is commonly fatal. But there must be allowed to be at all times a better ground for hope, when the means of cure are conducted with firmness and perseve-

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\* Why should not inoculation of the cow-pox be tried in every case of a bite by a rabid animal, if not previously done?

rance, the result of a rational theory, than when doubt, timidity, mystery, and empiricism, direct our practice. It would be as vain to point out the numerous instances of these being the only guides of practice, in the prevention and cure of this disease, as it would be to point out the efforts which they have dictated at different times. The burned crabs of Aeschrion; Dessault's pancake of oyster shells; the ash-coloured liverwort\* of Palmerius and Dr Mead; the turbith mineral of Dr James, with the pewter medicine, and others, have all met with the fate they deserved. The Tonquin medicine, consisting of native and factitious cinnabar and musk, introduced by Sir George Cobb, survived a little longer, and acquired a fame nearly as great as the Ormskirk medicine, prepared by the late Mr Hill. Both these preventive remedies have built the little fame they have obtained, on the circumstance of only one of a great number bitten by a rabid animal being seized with the disease; but one positive proof of their failure, and there are too many in existence, is worth a hundred negative proofs of their success.

Dr Heysham and Professor Black analysed the Ormskirk medicine, and found it to consist of half an ounce of powdered chalk, ten grains of alum, three drachms of Armenian bole, one drachm of the powder of elecampane root, and six drops of oil of anise. On such a composition what hopes are to be placed? Among the remedies that have proved equally fallacious,† blood-letting and the warm bath may be

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\* The cold bath was always used with this medicine.

† I am aware that the practice in this disease has, of late, been influenced by some accounts of the success of blood-letting in the East Indies; yet I still think it contrary to every indication from the symptoms, as the appearances of inflammation seem a consequence, not a cause.



named. There is no instance of success, where either of these means were used. Mercury has experienced the most complete trials; but the evidence in favour of it is no better than that in favour of the Ormskirk medicine. Leaving these all behind, let us turn our attention to the plan of prevention and treatment, which has gained the most general approbation.

Of the means of prevention, the method of dilution, pointed out by Dr Haygarth, deserves our first attention. He recommends to wipe the wound with a dry cloth, so as to absorb all moisture, then abundantly, and with the most persevering attention, to wash the part with water quite cold for several hours. After this warm water is to be used, to produce a flow of blood, which is to be poured from the spout of a tea-kettle held up at a considerable distance. The ablution should be accomplished with great diligence, and without delay.\* In a bad wound, with much laceration, to this ablution, cupping and syringeing are to be added; and in addition to this, it has been proposed that the wound should be enlarged, and even excision of the lacerated parts, when circumstances will admit of it. Dr Percival has proposed, as a farther security, that the parts after ablution may be washed with the gastric liquor of an animal recently killed, or with the juice of rennet†; next to ablution, *the keeping up a free discharge from the wound for a great length of time, seems to be of the greatest importance.*

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\* The effect of dilution in rendering the contagion of fever, small-pox, and cow-pox inoculations inert, gives great reason to hope the happiest consequences from this plan.

† When parts about the mouth are wounded, washing them well with the same, or with sea-water, or a weak solution of salt of tartar has been recommended.



This may be effected by repeated blistering, or by escharotics. It may here be remarked, that all trials to arrest the poison by means of caustics, gunpowder, and the like, have invariably failed; but after ablution their use to keep the wound open may be of service. Ligatures above and below the wounded part, where they can be applied, have been recommended during the ablution, by Dr Perceval. Apparently simple means produce very salutary effects; perhaps, after the ablution recommended by Dr Haygarth, the pouring of warm cow's milk from a tea-kettle in the same manner upon the wound, may be of use; we know that milk has the power of counteracting the effects of some poisons received into the stomach\*. Such are the means of prevention most likely to succeed. We now come to the treatment of the disease when such have not been used, or shall unfortunately fail. And here I may observe, that I was of late more immediately led to the consideration of the cure of this disease by seeing Dr Arnold's very interesting case of Hannah Springthorpe, which was treated by stimulants and antispasmodics, and terminated favourably. From this case and some others, it appears that our reliance ought to be entirely on such remedies, when the symptoms of the disease appear. Opium, musk, calcined zinc, with the *cold* bath, have been particularly named as most adapted to the disease. Dr Percival thinks

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\* These directions should be particularly attended to by persons in the country until a surgeon is procured, as they are of the *first importance*, and the surgeon should attend to the directions given by Mr Gillman in a late Essay, in case of excision of the parts, viz.—always to wipe clean, or change his knife, after every separate incision, until the part is entirely separated; and he should know that it is never too late to cut out a part, though it may have healed; nor even after weeks or months, if the part become painful. This attention to the knife is especially requisite if it touches in the operation on any part of the lacerated wound.

that the fox-glove, from its quick action and sedative powers, seems to promise to be of service in this disease. Dr Shadwell's case of John Cumbus, a drover, seems to shew, that the internal and external use of oil is of considerable service in allaying the irritability and spasms. From our knowledge of its component parts, it promises to be useful to answer this indication; but instead of frictions, perhaps a frequent immersion of the whole body in oil of a temperature a little above that of the body, might be more efficacious. The warm bath has always given momentary relief, which I attribute to the stimulus of heat; but the effect of this stimulus, applied through the medium of water, may not be so permanent as when applied through the medium of oil; besides the oil itself may act as a stimulant, and its effects may be also permanent. The internal use of oil should also be had recourse to; and when its use in this way is prevented by the spasmodic affection of the muscles of deglutition, perhaps it may be conveyed into the stomach by the same means\* as have been recommended for throwing food into the stomach in a paralysis of those muscles.

The benefit experienced from the use of the spirit of caustic volatile alkali, in preventing the bad effects of the

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\* A fresh eel skin, of rather a small size, (or the intestine of some animal will probably answer as well) drawn over a probang, and tied up at the end where it covers the sponge, and tied again close to the sponge where it is fastened to the whalebone, and a small longitudinal slit made into it immediately above this upper ligature. To the other end of the eel skin a bladder with a wooden pipe is fixed, the tube being large enough to permit the end of the probang to pass into the bladder without filling up the passage. The probang, thus covered, is introduced into the stomach, and food or medicines are put in the bladder, and squeezed down through the eel skin.



bite of a species of viper, induces Dr Bardsley to think, that this medicine may be of use in this disease. We cannot have too large a magazine of powerful stimulants to resort to in such a state of the body, as a succession is required in a rapid manner to produce any sensible effect in so short a period as commonly is allowed for their action ; perhaps the *Peruvian balsam* may be no trifling vehicle for the *volatile alkali*. Opium, in very small doses, has proved a powerful addition to the other means. The late Mr Hill used to give it with his medicine ; but as a preventive, it cannot be of any use. Æther may be properly added to it. I remember that Dr Black, in his lectures, always mentioned his suspicion of arsenic forming a part of Mr H.'s remedies. From the powerful tonic effect of the *mineral solution*, it appears adapted to every indication in the cure of convulsions ; I have stopped long established epileptic paroxysms by its powers. It has not been mentioned by any author I have read on this disease.\*

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To the above I will now add, that next to ablution, to which no objection can be made, the keeping the wound open for a proper time appears to be of the first importance, and that *tonics* and *antispasmodics* are chiefly to be relied upon if the symptoms of the disease should take place. Perhaps the operation of the *arsenical solution* may be too slow in such a rapid disease, after the symptoms have appeared, and that the bark with *valerian* may have a more immediate

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\* Since the date of this, I think arsenic has been recommended by Dr Bardsley.



effect. With these the cold affusion should be steadily used. I believe I may venture to assert, that few practitioners in the North have had opportunities of seeing such a variety of spasmodic diseases as have fallen to my situation to observe; and I can say, confidently, that in some valerian is of great use; and that in simple convulsion I have derived most decided relief from asafoetida, in form of solution, which may be given as a clyster also, when requisite. To all the means of cure in Hydrophobia may be added *topical* applications to the throat, which in one instance, it seems, were of the greatest use. The case did find its way, some time ago, into a periodical work, and I believe by means of the son of the author; yet as many may not have seen it, I will here repeat the leading circumstances of it; they are from a MS. of the late Dr Turnbull.

Robert Dixon, a weaver, of Norham Mains, near Berwick, was bitten on the leg by a mad dog, 30 July, 1761. The symptoms of Hydrophobia soon appeared; pain gradually ascended from the wound to the knee, thigh, stomach, with sickness and oppression at the breast. These sensations daily increased, and were followed by convulsions and stricures in the throat, which threatened suffocation, particularly when water was presented to him. To the wounded part a caustic was applied, and it was kept open by blistering, and stimulating ointment, *from the first*, until some time after all the symptoms were entirely gone. The leg was often bathed with warm oil. A teaspoonful of a tonic electuary was given four times a day, consisting of bark, valerian, musk, and camphor; opium was also given, to assuage the irritation and spasms. To the throat was applied a plaister, consisting of opium, frankincense, camphor, asafoetida, and gum galbanum. The man, after his recovery, declared that he *felt* more relief from *the plaister* than any other thing; he said that it gave a pleasant warmth

to his throat, and from thence its effects followed in the same direction to the wound as the pain had ascended from it.

This case has been by some suspected not to have been the real disease ; but such suspicions have generally followed any case successfully treated.

I must again repeat, that if the importance of the preventive plan above-mentioned is duly considered, it cannot fail of making a proportionate impression on the mind. If the means of dilution should not be sufficient to render the poison inert, then another great chance is obtained by a discharge from the wound ; and this hope is strongly supported by analogy in the inoculation of both cow-pox and small-pox, which is known often to fail, when the part inoculated has been disturbed or broken, so as to occasion an early discharge. By the knowledge of this, the mind too of the patient must be very much relieved.

Thus I have endeavoured to comprise, within narrow limits, the history, and the means of prevention and cure of this yet terrific disease ; and I cannot conclude without expressing my ardent hope, that by such methods it will in time be overcome.

*Newcastle, Leazes Cottage, July 10, 1814.*

